

We Claim:

1. A flexible fluid containment vessel for the transportation and/or containment of cargo comprising a fluid or fluidisable material, said
5 vessel comprising:
 - an elongated flexible tubular structure comprised of fabric having a first circumference;
 - means for rendering said tubular structure impervious;
 - 10 said tubular structure having a front end and a rear end;
 - means for sealing said front end and said rear end;
 - means for filling and emptying said vessel of
15 cargo;
 - wherein at least one of said front end or rear end comprises a plurality of folds or pleats of fabric of the tubular structure with said pleats having ends which are sealed, a clamping means
20 positioned about said pleats maintaining said pleats in a fixed position, said pleat ends defining a second circumference which is less than that of the first circumference, said pleats extending over a portion of said tubular structure and gradually
25 increasing in size from a point on the tubular structure to said pleat ends so as to create a conical or tapered end.
2. The vessel in accordance with claim 1 which
30 includes a fitting attached to and sealing the ends of the pleats to said fitting.

3. The vessel in accordance with claim 1 wherein the pleats are folded in a clockwise direction, counterclockwise direction or a combination thereof or folded upon themselves in a stacked arrangement about the second circumference.

4. The vessel in accordance with claim 1 wherein the tubular structure has a longitudinal axis and a plurality of pleats are formed at an angle to said longitudinal axis.

5. The vessel in accordance with claim 1 wherein said front end and said rear end are so formed.

6. A flexible fluid containment vessel for the transportation and/or containment of cargo comprising a fluid or fluidisable material, said vessel comprising:

- an elongated flexible tubular structure comprised of fabric having a first circumference and a longitudinal axis;
- means for rendering said tubular structure impervious;
- said tubular structure having a front end and a rear end;
- means for sealing said front end and said rear end;
- means for filling and emptying said vessel of cargo;
- wherein said tubular structure comprises a plurality of folds or pleats of fabric extending from the front end to the rear end which are substantially parallel to the longitudinal axis,

said pleats having ends which are sealed and means fixing said pleat ends in position whereupon filling said tubular structure with cargo causes said pleats to expand with, however, said pleat ends remaining
5 fixed.

7. The vessel in accordance with claim 6 which includes a fitting attached to and sealing the ends of the pleats to said fitting.
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8. A flexible fluid containment vessel for the transportation and/or containment of cargo comprising a fluid or fluidisable material, said vessel comprising:
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an elongated flexible tubular structure comprised of fabric having a first circumference and a longitudinal axis;

means for rendering said tubular structure impervious;

20 said tubular structure having a front end and a rear end;

means for sealing said front end and said rear end;

means for filling and emptying said vessel of
25 cargo;

wherein at least one of said front end or rear end comprises a portion of fabric gathered from the tubular structure along a portion of the longitudinal axis extending from one point thereon
30 to said end defining an end portion, said fabric being progressively gathered from said point to said end, said gathered fabric having an internal surface and an external surface with said internal surface

being sealed, said gathered fabric being mechanically fixed in place at said end, said end defining a second circumference which is less than the first circumference and said end portion so
5 formed is conical or tapered in shape.

9. A vessel in accordance with claim 8 which includes a fitting attached to and sealing said end.

10. A vessel in accordance with claim 8 wherein said gathered fabric is gathered in a manner comprising folding onto itself in a spiral manner, folding it back and forth onto itself in an oscillating manner or a combination of both.
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11. A vessel in accordance with claim 8 which includes a plurality of portions of gathered fabric positioned at a spaced distance from each other.

12. A vessel in accordance with claim 11 wherein said plurality of portions of gathered fabrics are equidistant from each other about said end portion.
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13. A vessel in accordance with claim 8 which includes a fold facilitator means which facilitates folding of the gathered fabric.
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14. A vessel in accordance with claim 11 which includes a plurality of fold facilitator means for respective portions of gathered fabric.
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15. A vessel in accordance with claim 8 wherein said gathered fabric is mechanically fixed in place by a clamp positioned about said end.

5 16. A vessel in accordance with claim 8 wherein said front end and said rear end are so formed.

17. A flexible fluid containment vessel for the transportation and/or containment of cargo
10 comprising a fluid or fluidisable material, said vessel comprising:

an elongated flexible tubular structure comprised of fabric having a first circumference and a longitudinal axis;

15 means for rendering said tubular structure impervious;

said tubular structure having a front end and a rear end;

20 means for sealing said front end and said rear end;

means for filling and emptying said vessel of cargo;

wherein at least one of said front end or rear end comprises a plurality of radially extending
25 folds or teeth of fabric of the tubular structure with said folds having ends, means for fixing said ends in position, said ends defining a second circumference which is less than that of the first circumference, said folds extending over a portion
30 of said tubular structure and gradually increasing in depth from a point on the tubular structure to said fold ends so as to create a conical or tapered end.

18. The vessel in accordance with claim 17 wherein said means for fixing said folds in position includes an end closure device located at said end.

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19. The vessel in accordance with claim 18 wherein said folds have an internal surface and an external surface and said end closure device includes a first portion on the external surface and a second portion on the internal surface with said first and second portions mechanically coupled together with said fold positioned therebetween.

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20. The vessel in accordance with claim 19 which includes a plurality of end closure devices positioned about said ends and define said second circumference.

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21. The vessel in accordance with claim 20 which includes a fitting attached to said end closure devices.

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22. The vessel in accordance with claim 17 wherein said front end and rear end are so formed.

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23. A flexible fluid containment vessel for the transportation and/or containment of cargo comprising a fluid or fluidisable material, said vessel comprising:

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an elongated flexible tubular structure comprised of fabric having a first circumference; means for rendering said tubular structure impervious;

said tubular structure having a front end and a rear end;

means for sealing said front end and said rear end;

5 means for filling and emptying said vessel of cargo;

wherein at least one of said front end or rear end comprises a plurality of radially extending folds of fabric of the tubular structure with said
10 folds having ends, means for fixing said ends in position, said ends being in a star like configuration with a center of the star defining a second circumference which is less than that of the first circumference, said folds extending over a
15 portion of said tubular structure and gradually increasing in depth from a point on the tubular structure to said fold ends so as to create a conical or tapered end.

20 24. The vessel in accordance with claim 23 wherein said means for fixing said folds in position includes an end closure device located at said end.

25 25. The vessel in accordance with claim 24 wherein said folds have an internal surface and an external surface and said end closure device includes a first portion on the external surface and a second portion on the internal surface with said first and second portions mechanically coupled together.

30 26. The vessel in accordance with claim 25 which includes a plurality of end closure devices positioned between said ends and being mechanically

coupled together with said folds positioned therebetween.

27. The vessel in accordance with claim 26 which
5 includes a fitting attached to said end closure devices.

28. The vessel in accordance with claim 23 wherein
10 said front end and rear end are so formed.

29. A method of fabricating a large flexible fluid
containment vessel for the transportation and/or
containment of cargo comprising a fluid or
fluidisable material, said method comprising:

15 forming an elongated flexible tubular structure
comprised of fabric having a first circumference;
rendering said tubular structure impervious;
forming a front end and a rear end;
sealing said front end and said rear end;
20 providing means for filling and emptying said
vessel of cargo;

weaving, knitting or braiding at least one
front end or rear end of the tubular structure,
having a taper that terminates in a second
25 circumference that is less than the first
circumference.

30. The method as described in claim 29 which
includes the step of weaving the tubular structure
30 with warp and weft fibers or yarns and weaving the
taper at said end by gradually eliminating warp
yarns in a sequential manner as said end is woven.

31. The method as described in claim 29 which includes the step of weaving the tubular structure with warp and weft fibers or yarns and weaving the taper at said end by drawing in the warp yarns as
5 said end is woven.

32. The method as described in claim 29 which includes the step of knitting the taper at said end by gradually dropping knitting needles during the
10 knitting of said end to create the taper.

33. The method as described in claim 29 which includes the step of knitting the tubular structure.

15 34. The method as described in claim 29 which includes the step of braiding the taper at said end by adjusting the speed of the take up relative to the speed of the fiber or yarn that is being braided.

20 35. The method as described in claim 29 which includes the step of braiding the tubular structure.

25 36. The method as described in claim 29 which includes the step of weaving, knitting or braiding the front end and the rear end with tapers.

30 37. A flexible fluid containment vessel for the transportation and/or containment of cargo comprising a fluid or fluidisable material, said vessel comprising:

an elongated flexible tubular structure comprised of fabric having a first circumference;

means for rendering said tubular structure
impervious;

said tubular structure having a front end and a
rear end;

5 means for sealing said front end and said rear
end;

means for filling and emptying said vessel of
cargo;

wherein at least one of said front end or rear
10 end comprises fabric gathered so as to define a
second circumference which is less than that of the
first circumference at one of said ends and ring
means maintaining said gathered fabric in a fixed
position.

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38. The vessel in accordance with claim 37 which
includes an end fitting mechanically attached to
said ring means:

20 39. The vessel in accordance with claim 37 wherein
said gathered fabric is folded upon said ring means
and secured in place.

40. The vessel in accordance with claim 37 wherein
25 said front end and rear end is so formed.

41. A method of creating a front end or rear end of
a flexible fluid containment vessel for the
transportation and/or containment of cargo
30 comprising a fluid or fluidisable material
comprising the steps of:

providing an elongated flexible tubular structure comprised of fabric having a first circumference and a front end and a rear end,

gathering the fabric at at least one of said
5 front end or rear end about a mandrel so as to define a second circumference which is less than that of the first circumference;

positioning a ring about said gathered fabric;
and

10 folding said gathered fabric upon said ring and securing it thereto.

42. The method as described in claim 41 which includes the further step of securing an end fitting
15 to said ring.

43. The method as described in claim 41 which includes the further step of forming said front end and said rear end in such a manner.